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10/644,934	08/21/2003	Jun-Ichi Yamato	Q76950	7364

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EXAMINER

MEHRMANESH, ELMIRA

ART UNIT PAPER NUMBER

2113

DATE MAILED: 06/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/644,934

Applicant(s)

YAMATO ET AL.

Examiner

Elmira Mehrmanesh

Art Unit

2113

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

The application of Yamato et al., for a "Data copying system, relaying device, data transfer/reception system and program for copying of data in storage unit" filed August 21, 2003, has been examined.

Claims 1-34 are presented for examination.

Information disclosed and listed on PTO 1449 has been considered.

Claims 1-34 are rejected under 35 USC § 102.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-19, 27-29, 31-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Staheli et al. (U.S. Patent No. 5,537,533).

As per claim 1, Staheli discloses a data copying system comprising:

a first storage unit (Fig. 1, element 16)

a second storage unit (Fig. 1, element 20)

data stored in said first storage unit being copied by mirroring or backup to said second storage unit (col. 8, lines 49-55) over a communication network (Fig. 1, element 50)

a relaying device for relaying data (Fig. 1, elements 30, 40) transferred from said first storage unit (Fig. 1, element 16) to said second data storage unit (Fig. 1, element 20) over the communication network (Fig. 1, element 50)

said relaying device being provided in a location pre-calculated so that, even if said first storage device cannot be operated due to a disaster, the operation of said relaying device can be continued (col. 15, lines 2-7)

wherein said first storage unit includes data transfer processing means for controlling data transfer, said data transfer processing means regarding the data transfer from said first storage unit to said second storage unit as being completed when data transfer from said first storage unit to said relaying device is completed (col. 12, lines 2-11).

As per claim 2, Staheli discloses said relaying device includes:

non-volatile storage means for storing a command and data received from the first storage unit (Fig. 2, elements 66, 68)

relaying processing means for relay controlling the data, said relaying processing means causing the command and the data received from said first storage unit to be stored in said non-volatile storage means and transmitting the command and data stored in said non-volatile storage means to said second storage unit at an optional

timing (col. 14, lines 36-53).

As per claim 3, Staheli discloses a plurality of said relaying devices (Fig. 1, elements 30, 40), wherein said data transfer processing means in said first storage unit simultaneously sends data stored in said first storage unit to a plurality of said relaying devices (col. 14, lines 36-53).

As per claim 4, Staheli discloses a relaying device (Fig. 1, element 30) for relaying data transferred from a first storage unit (Fig. 1, element 16) to a second storage unit (Fig. 1, element 20), said relaying device comprising:

storage means for storing data received from said first storage unit (Fig. 2, elements 66, 68) and (col. 14, lines 36-53)

relaying processing means for relay controlling data (Fig. 1, elements 30, 40)

wherein said relaying processing means causes data received from said first storage unit to be stored in said storage means (col. 14, lines 36-53)

wherein, when the data is stored in said storage means, said relaying processing means sends a response (col. 12, lines 2-11) to said first storage unit and sends the data stored in said storage means to said second storage unit (col. 13, lines 12-18).

As per claim 5, Staheli discloses a transmitting/receiving method, in which data transmitted from a source unit (Fig. 1, element 10) is received by a destination unit (Fig. 1, element 12), said method comprising the steps of:

Art Unit: 2113

said source unit creating at least one redundant data for error correction from original data to be transmitted (Fig. 3)

said source unit transmitting the original data and the redundant data in separate data transmission units (Fig. 1, elements 30, 40). Figure 1, shows link interfaces 34 and 44 as a part of the relay devices 30 and 40.

As per claim 6, Staheli discloses said destination unit (Fig. 1, element 12) executing error correction processing before completion of reception of an entire assemblage of data (col. 6, lines 7-15) comprised of a set of the original data and the redundant data, at a stage when a portion of said data set enabling partial error correction of said original data is received. Figure 4, shows events involved in receiving a packet of mirrored data sent from the primary data transfer unit over the communication link to the remote data transfer unit.

As per claim 7, Staheli discloses said source unit dividing the original data into divided data and creating redundant data which enables restoration of the original data even on occurrence of loss of one or more of said divided data (col. 12, lines 12-30).

As per claim 8, Staheli discloses parity data or ECC (Error Correction Code) is used as said redundant data (col. 12, lines 39-48).

As per claim 9, Staheli discloses copied data of transmission data is used as said redundant data (col. 14, lines 36-43).

As per claim 10, Staheli discloses the original data and the redundant data are sent over separate communication networks (Fig. 1, elements 30, 40 and 50). Figure 1, shows link interfaces 34 and 44 as a part of the relay devices 30 and 40.

As per claim 11, Staheli discloses a data copying system comprising:

a first storage unit (Fig. 1, element 16)

and a second storage unit (Fig. 1, element 20)

data stored in said first storage unit being copied by mirroring or backup to said second storage unit (col. 8, lines 49-55) over a communication network (Fig. 1, element 50)

wherein said first storage unit includes: data transfer processing means for controlling data transfer and redundancy processing means for creating at least one redundant data for error correction from the original data to be transmitted (col. 12, lines 39-48) said data transfer processing means transmitting the original data and the redundant data created by said redundancy processing means in separate data transfer units (Fig. 1, elements 30, 40).

Art Unit: 2113

As per claim 12, Staheli discloses data restoration means for executing error correction processing using the redundant data received from said first storage unit (col. 6, lines 7-23)

and storage processing means for storing the data restored by said data restoration means on a recording medium (Fig. 2, element 66)

wherein said data restoration means executes error correction processing before completion of reception of an entire assemblage of data comprised of a set of the original data and the redundant data, at a stage when a portion of said data set enabling partial error correction of said original data is received (col. 6, lines 7-23).

As per claim 13, Staheli discloses said redundancy processing means in said first storage unit divides said original data into divided data and creates redundant data which enables restoration of the original data even on occurrence of loss of one or more of said divided data (col. 12, lines 12-30).

As per claim 14, Staheli discloses said redundancy processing means uses parity data or ECC (Error Correction Code) as said redundant data (col. 12, lines 39-48).

As per claim 15, Staheli discloses said redundancy processing means uses copied data of transmission data as said redundant data (col. 14, lines 36-43).



Art Unit: 2113

As per claim 16, Staheli discloses said data transfer processing means sends the original data and the redundant data over separate communication network (Fig. 1, elements 30, 40 and 50). Figure 1, shows link interfaces 34 and 44 as a part of the relay devices 30 and 40.

As per claim 17, Staheli discloses a data copying system comprising:  
a storage unit (Fig. 1, element 16) of an operation system (Fig. 1, element 10)  
and a storage unit (Fig. 1, element 20) of a standby system (Fig. 1, element 12)  
data stored in said storage unit of the operation system being copied to said storage unit of the standby system over a communication network by mirroring (col. 8, lines 49-55)

wherein said storage unit of the operation system includes: delay write requesting means for sending data as a target of writing and a delay write request to said storage unit of the standby system on occurrence of a data write request (col. 6, lines 24-34)

write execution requesting means for sending a delay write execution request to said storage unit of the standby system on receipt from a higher rank device of a restart enabling point notification asserting a restart enabling point for which an application may directly restart operation for prevailing data state (col. 6, lines 24-34)

wherein said storage unit of the standby system includes: temporary storage means for temporarily storing data (Fig. 2, elements 66, 68)

storage processing means for storing received data in said temporary storage means responsive to the delay write request received and for storing the data stored in said temporary storage means in said recording medium on receipt of said delay write execution request (col. 6, lines 24-34).

As per claim 18, Staheli discloses the delay write requesting means and the delay write execution requesting means in said storage unit of the operation system asynchronously send a delay write request and a delayed write execution request to said storage unit of the standby system (col. 6, lines 24-34)

wherein said storage processing means in said storage unit of the standby system on receipt of one delay write execution request causes data stored in said temporary storage means to be stored in the recording medium when data associated with the delay write request transmitted between a delay write execution request directly previous to said one delay write execution request and said one delay write execution request have all been stored in said temporary storage means and when the data transmitted before said directly previous delay write execution request have been stored in said recording medium (col. 6, lines 24-34).

As per claim 19, Staheli discloses when an abnormality occurs in the operation system, said storage processing means in said storage unit of the standby system discards data stored in said temporary storage means (Fig. 4).

As per claim 27, Staheli discloses a computer program product comprising a computer usable medium having computer readable program code therein, said program code causing a computer provided in a relaying device in a data copying system,

in which data in a first storage unit is copied by mirroring or backup to a second storage unit (col. 8, lines 49-55) via a communication network (Fig. 1, element 50)

and the relaying device (Fig. 1, elements 30,40) to execute the steps of: causing storage of data received from said first storage unit in a recording medium in the relaying device; sending a response (col. 12, lines 2-11) to said first storage unit on storage of data in said recording medium in said relaying device; and sending the data stored in the recording medium in the relaying device to said second storage unit (col. 12, lines 2-11).

As per claim 28, Staheli discloses a computer program product comprising a computer usable medium having computer readable program code therein, said program code causing a computer provided in a first storage unit (Fig. 1, element 16) in a data copying system, in which data in the first storage unit is copied by mirroring or backup to a second storage unit (col. 8, lines 49-55) via a communication network (Fig. 1, element 50) to execute the steps of: forming at least one redundant data for error correction from transmitted original data (col. 6, lines 7-23) and transmitting the original data and the redundant data by separate data transfer units (Fig. 1, elements 30, 40).

As per claim 29, Staheli discloses a computer program product comprising a computer usable medium having computer readable program code therein, said program code causing a computer provided in an operation storage unit in a data copying system, in which data in the operation storage unit is copied by mirroring to a standby storage unit (col. 8, lines 49-55) via a communication network (Fig. 1, element 50) to execute the steps of: sending data to be written and a delay write request instructing storage of the data in a temporary storage device to said storage unit of the standby system, on occurrence of a data write request; sending to said storage unit of the standby system a delay write execution request instructing storage in the recording medium of data stored in the temporary storage device on receipt from a higher rank device of a restart enabling point notification asserting a restart enabling point for which an application may directly restart operation for prevailing data state (col. 6, lines 24-34).

As per claim 31, Staheli discloses a plurality of said relaying devices (Fig. 1, elements 30, 40), wherein said data transfer processing means in said first storage unit simultaneously sends data stored in said first storage unit to a plurality of said relaying devices (col. 8, lines 49-55).

As per claim 32, Staheli discloses a higher rank device of the operation system employing the storage unit of the operation system includes restart enabling point

Art Unit: 2113

notification means for sending a restart enabling point notification to said storage unit of the normal system when timing is a restart enabling point (col. 6, lines 24-34)

wherein a higher rank device of the standby system employing the storage unit of the standby system on detection of an abnormality of said operation system notifies the storage unit of the standby system of the occurrence of an abnormality to prompt restoration of the status of the storage unit of the standby system to a state corresponding to said restart enabling point to restart the processing when the state of the storage unit of the standby system is the state corresponding to the restart enabling point (col. 6, lines 7-23).

As per claim 33, Staheli discloses a higher rank device of the operation system employing the storage unit of the operation system includes: execution image transfer means for transferring an execution image indicating the processing executing state of the operation system to a higher rank device of the standby system employing the storage unit of the standby system (col. 14, lines 36-53)

optional time point restart enabling point notification means for sending a restart enabling point notification at a timing of the execution image transmitting means transmitting an execution means (col. 6, lines 24-34)

wherein said higher rank device of the standby system employing said storage unit of the standby system includes execution image saving means for saving an execution image transferred by said execution image transfer means, said execution

Art Unit: 2113

image transfer means transferring an execution image at an optional time point to said higher rank device of the standby system (col. 14, lines 36-53)

wherein said higher rank device of the standby system employing said storage unit of the standby system on detection of an abnormality of said operation system notifies the storage unit of the standby system of the occurrence of the abnormality to prompt restoration of the status of the storage unit of the standby system to a state corresponding to said restart enabling point, so as to restart the processing, using an execution image, when the state of said storage unit of the standby system is the state corresponding to the restart enabling point (col. 14, lines 36-53).

As per claim 34, Staheli discloses the execution image transferring means in said higher rank device of the operation system transfers only the portion changed from the execution image transferred last time (Fig. 5).

Claims 20-26, 30 are rejected under 35 U.S.C. 102(b) as being anticipated by West et al. (U.S. Patent No. 6,131,148).

As per claim 20, West discloses a data copying system comprising:

a storage unit of an operation system (Fig. 1, elements 12, 32)

a storage unit of an operation system, data in said storage unit of the operation system being copied by mirroring (col. 4, lines 28-31) to said storage unit of the standby system (Fig. 1, element 14) over a communication network (Fig. 1, element 40)

wherein said storage unit of the standby system includes: write requesting means which, on occurrence of a data write request, sends data to be written and a write request to said storage unit of the standby system (col. 4, lines 7-18)

snap shot formation requesting means for sending a snap shot forming request to said storage unit of the standby system on receipt from a higher rank device of a restart enabling point notification asserting a restart enabling point for which an application may directly restart operation for prevailing data state (col. 5, lines 51-65 and col. 2, lines 44-50)

wherein said storage unit of the standby system includes: snap shot forming means which, on receipt of a write request, allocates an area for writing data corresponding to said write request to store the data in said recording medium and to update the storage information indicating the state of data storage in said recording medium, and which on receipt of the snap shot forming request forms a snap shot (col. 4, lines 43-55).

As per claim 21, West discloses when the snap shot forming means in said storage unit of the standby system forms a snap shot, said write requesting means sends a write request to said storage unit of the standby system after said snap shot forming means completes forming the snap shot (col. 4, lines 7-18).

As per claim 22, West discloses said write requesting means and the snap shot formation requesting means in the storage unit of the operation system asynchronously

send the write request and the snap shot forming request to the storage unit of the standby system (col. 4, lines 7-11)

said snap shot forming means in said storage unit of the standby system on receipt of each write request awaits storage of data corresponding to the write request in the recording medium until the snap shot based on the snap shot forming request directly before the received write request is formed completely (col. 4, lines 11-18)

said snap shot forming means on receipt of one snap shot forming request forming a snap shot when a snap shot based on the directly previous snap shot forming request is completed and all data corresponding to the write request transmitted between said directly previous snap shot forming request and said one snap shot forming request have all been stored in the recording medium (col. 4, lines 7-18 and 43-55).

As per claim 23, West discloses when an abnormality occurs in an operation system, said snap shot forming means in the storage unit of the standby system releases the area of the recording medium, where data has been stored after forming the directly previous snap shot, to a non-use state, to restore the stored information to the state at the time of forming the directly previous snap shot (col. 7, lines 26-50).

As per claim 24, West discloses a higher rank device of the operation system employing the storage unit of the operation system (col. 6, lines 12-24) includes restart enabling point notification means for sending a restart enabling point notification to said



Art Unit: 2113

storage unit of the normal system when timing is a restart enabling point (col. 7, lines 26-50)

wherein a higher rank device of the standby system employing the storage unit of the standby system on detection of an abnormality of said operation system notifies the storage unit of the standby system of the occurrence of an abnormality to prompt restoration of the status of the storage unit of the standby system (col. 3, lines 41-49) to a state corresponding to said restart enabling point to restart the processing when the state of the storage unit of the standby system is the state corresponding to the restart enabling point (col. 6, lines 66-67 through col. 7, lines 1-9).

As per claim 25, West discloses a higher rank device of the operation system employing the storage unit of the operation system includes: execution image transfer means for transferring an execution image indicating the processing executing state of the operation system to a higher rank device of the standby system employing the storage unit of the standby system (col. 6, lines 12-24)

optional time point restart enabling point notification means for sending a restart enabling point notification at a timing of the execution image transmitting means transmitting an execution means (col. 7, lines 26-50)

wherein a higher rank device of the standby system employing said storage unit of the standby system includes execution image saving means for saving an execution image transferred by said execution image transfer means, said execution image

Art Unit: 2113

transfer means transferring an execution image at an optional time point to said higher rank device of the standby system (col. 6, lines 12-24)

wherein said higher rank device of the standby system employing said storage unit of the standby system on detection of an abnormality of said operation system notifies the storage unit of the standby system of the occurrence of the abnormality to prompt restoration of the status of the storage unit of the standby system to a state corresponding to said restart enabling point, so as to restart the processing, using an execution image, when the state of said storage unit of the standby system is the state corresponding to the restart enabling point (col. 7, lines 26-50).

As per claim 26, West discloses the execution image transferring means in said higher rank device of the operation system transfers only the portion changed from the execution image transferred last time (col. 5, lines 26-36).

As per claim 30, West discloses a computer program product comprising a computer usable medium having computer readable program code therein, said program code causing a computer provided in an operation storage unit in a data copying system, in which data in the operation storage unit is copied by mirroring to a standby storage unit (col. 4, lines 28-31) via a communication network (Fig. 1, element 40) to execute the steps of: sending data to be written and a write request instructing writing the data in a recording medium, to said storage unit of the standby system (Fig. 1, element 14) on occurrence of a data write request; and sending to said storage unit

Art Unit: 2113

of the standby system a snap shot forming request on receipt from a higher rank device of a restart enabling point notification asserting a restart enabling point for which an application may directly restart operation for prevailing data state (col. 4, lines 7-18).

### **Related Prior Art**

The following prior art is considered to be pertinent to applicant's invention, but nor relied upon for claim analysis conducted above.

Duyanovich et al. (U.S. Patent No. 5,555,371), "Data backup copying with delayed directory updating and reduced numbers of DASD accesses at a back up site using a log structured array data storage".

Micka et al. (U.S. Patent No. 6,148,383), "Storage system employing universal timer for peer-to-peer asynchronous maintenance of consistent mirrored storage".

West et al. (U.S. Patent No. 6,912,629), "System and method for restoring data from secondary volume to primary volume in a data storage system".

Obara et al. (U.S. Patent No. 6,966,001), "Computing system and data decryption method and computer system with remote copy facility".


### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elmira Mehrmanesh whose telephone number is (571) 272-5531. The examiner can normally be reached on 8-5 M-F.

Art Unit: 2113

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert W. Beausoliel can be reached on (571) 272-3645. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
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